Lock-out / Tag-out:
The Control of Hazardous Energy
29 CFR 1910.147

Occupational Safety & Health Bureau

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Prepared for Montana Employers
by the

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Introduction

This booklet provides the basic guidelines for developing a lockout / tagout program for the workplace as well as an overview of the general industry standard 29 CFR 1910.147. This standard covers the servicing and maintenance of machines and equipment in which their "unexpected" energization, start up or release of stored energy could cause injury to employees. Energy may consist of gravitational, hydraulic, pneumatic, electric, and kinetic.

This booklet is not intended to be totally inclusive of the Occupational Safety and Health Administration's (OSHA's) standard or does not alter the standard but to give employers a better understanding of the standard and control procedures. Employers should obtain a copy of the standard and develop their own site-specific policy for lockout / tagout procedures on machines and equipment. Program guidelines are listed in Appendix A. of the booklet.

The standard identifies the practices and procedures necessary to shut down and lockout or tagout machines and equipment, requires that employees receive training in their role in the lockout/tagout program, and mandates that periodic inspections be conducted to maintain or enhance the energy control program.

In general, the standard requires that before service or maintenance is performed on machines or equipment they must be turned off and disconnected from the energy source, and the energy-isolating device must be either locked or tagged out.

I. Servicing and/or Maintenance Operations

If a servicing activity such as lubricating, cleaning, or unjamming the production equipment, takes place during production, the employee performing the servicing may be subjected to hazards that are not encountered as part of the production operation itself. Workers must use a lockout/tagout policy when one of the following occur:

- The employee must either remove or bypass machine guards or other safety devices, resulting in exposure to hazards at the point of operation;

- The employee is required to place part of his/her body in contact with the machine or equipment's point of operation; or

- The employee is required to place any part of his/her body into a danger zone associated with a machine operating cycle.

In the above situations, the equipment must be deenergized and locks or tags applied to the energy-isolation devices (circuit breaker, disconnect switch, power switch).

When other servicing operations occur, such as setting up equipment, or making adjustments to machines, employees performing tasks are required to lock out or tag out if they can be injured by unexpected

energization or startup of the equipment. When adjustments must be made with the power on, employers must provide effective protection when employee make the adjustments.

II. Energy Control Program

This standard requires that the employer establish an energy control program that includes:

(1.) documented energy control procedures,
(2.) an employee training program, and
(3.) periodic inspections of the use of the procedures.

Employers are required to establish a program to ensure that machines and equipment are isolated and inoperative before any employee performs servicing or maintenance where the unexpected energization, start up, or release of stored energy could occur and cause injury.

The purpose of the energy control program is to ensure that, whenever the possibility of unexpected machine or equipment startup or energization exists or the unexpected release of stored energy could injure a worker during maintenance or servicing, the equipment is isolated from its energy source(s) and rendered inoperative prior to working on it.

A. Energy Control Procedure

The standard requires that energy control procedures be developed, documented, and used to control potentially hazardous energy whenever workers perform activities covered by the standard.

Written procedures must identify the information that the authorized employees must know to control hazardous energy during servicing or maintenance. If this information is the same for various machines or equipment then a single energy control procedure may be sufficient. If there are other conditions such as multiple energy sources or different connecting means, then the employer must develop separate energy controls procedures to protect employees. The energy control procedures must outline the scope, purpose, authorization, and techniques that will be used to control hazardous energy as well as the means that will be used to enforce compliance.

At a minimum, the procedures must include, the following elements:

- A statement on how the procedures will be used;
- The procedural steps needed to shut down, isolate, block, and secure machines/equipment;
- The steps designating the safe placement, removal, and transfer of lockout/tagout devices and who is responsible for them;
- The specific requirements for testing machines/equipment and verifying the effectiveness of locks, tags, and other energy control measures; and
- The employer or an authorized employee must notify affected employees before lockout or tagout devices are applied and after they are removed.

Procedures for applying a lockout/tagout device are:

(1.) preparing for shutdown,
(2.) shutdown,
(3.) isolation of machine or equipment from the energy source(s),
(4.) application of the lockout/tagout device(s) to the energy-isolating device(s),
(5.) safely releasing all potentially hazardous stored or residual energy, and
(6.) verifying the isolation of the machine or equipment prior to the start of work.

Before lockout or tagout devices are removed and energy is restored to the machines or equipment, certain steps must be taken to reenergize equipment after servicing is completed:

(1.) ensuring that machines or equipment components are operationally intact,
(2.) ensuring that all employees are safely positioned or removed from equipment, and
(3.) ensuring that lockout or tagout devices are removed from each energy-isolating device by the employee who applied the device.

B. Employee Training

The employer must provide effective initial training and retraining as necessary and must certify that such training has been given to all employees covered by the standard. The certification must contain each employee's name and dates of training. There are three types of employees that need different levels of training -- authorized, affected, and other. Training must include at least the following:

1. **Authorized** - employees with the responsibility for implementing the energy control procedures and performing the servicing or maintenance.

- Recognition of applicable hazardous energy sources.
- Details about the type and magnitude of the hazardous energy sources present in the workplace.
- The methods and means necessary to isolate and control those energy sources.

2. **Affected** - usually machine operators or users; and **other.**

- Recognize when the control procedure is being used.
- Understand the purpose of the procedure and the importance of not attempting to start up or use the equipment that has been locked or tagged out.

When using tagout, in addition to normal training required for all employees, employees must be trained in the following limitations of tags:

- Tags are essentially warning devices and do not provide the physical restraint of a lock.
- Tags must be legible and understandable by all employees.

- When a tag is attached to an isolating means, it is not to be removed except by the person who applied it, and it is never to be bypassed, or ignored.

- Tags and their attachments must be made of materials that will withstand the environmental conditions encountered in the workplace.

- Tags may evoke a false sense of security. They are only one part of an overall energy control program.

- Tags must be securely attached to the energy-isolating devices so that they cannot be detached accidentally during use.

All employees must understand that whenever there is a lockout or tagout device in place only the person who put it on should remove it and to leave it in place and do not try to start locked out or tagged out machine.

C. Periodic Inspections

A periodic inspection of each procedure, when usage is at least once a year, must be performed at least annually to assure that the energy control procedures continue to be implemented properly and that the employees are familiar with their responsibilities under those procedures. The periodic inspection must be designed to correct any deviations of inadequacies observed. An authorized employee other than the one(s) using the energy control procedure must perform the inspections. Each inspection must be documented and corrections made immediately.

III. Energy-Isolating Devices

There are two types of energy-isolating devices: those capable of being locked and those that are not. When the energy-isolating device cannot be locked out, the employer must use a tagout. The employer may also modify or replace the device to make it capable of being locked-out.

If the energy-isolating device is lockable, the employer must use locks unless he or she can demonstrate that the use of tags would provide protection at least as effective as locks and would assure “full employee protection.”

Full employee protection includes complying with all tagout-related provisions plus implementing additional safety measures that can provide the level of safety equivalent to that obtained by using lockout. This might involve removing and isolating a circuit element, blocking a controlling switch, opening an extra disconnecting device, or removing a valve handle to reduce the potential for any inadvertent energization while tags are attached.

Locks, tags, chains, wedges, key block, adapter pins, self-locking fasteners, or other hardware can be used as energy-isolating devices.

IV. Requirements for Lockout/Tagout Devices

A lockout device provides protection by preventing the machine or equipment from becoming energized. A tagout device identifies the energy-isolating device as a source of potential danger and that equipment or machine will not be operated with the tag in place.

Lockout and tagout devices shall be singularly identified; shall be the only device(s) used for controlling energy; can not be used for other purposes; and must meet the following requirements:

- Durability - lockout and tagout devices must withstand the environment to which they are exposed for the maximum duration of the expected exposure.

- Standardized - Lockout and tagout devices must be standardized according to either color, shape, or size. Tagout devices must also have standard print and format.

- Substantial - Lockout or tagout devices must be substantial enough to minimize early or accidental removal. Locks must be substantial to prevent removal except by excessive force of special tools such as bolt cutters or other metal cutting tools. Tag means of attachment must be nonreusable, attachable by hand, self-locking, and nonreleasable, with a minimum unlocking strength of no less than 50 pounds.

- Identifiable - Lockout and tagout devices must clearly indicate the identity of the employee applying the device(s). Tags also must warn against hazardous conditions if the machine or equipment is energized and must include a legend such as the following:

  DO NOT START, DO NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, DO NOT OPERATE.

V. Resources

Information about lockout/tagout and the OSHA standard can be obtained from the sources listed bellow:

1. U.S. Department of Labor, **Occupational Safety & Health Administration**, **(OSHA).**
Public Affairs Office- Room 3647, 200 Constitution Ave., Ashington, D.C. 20210.
Phone: 1-202-693-1999.
www.osha.gov

2. **National Institute for Occupational Safety and Health**, **(NIOSH)**.
Department of Health and Human Services, 200 Independence Ave. SW 317B, Washington, DC 20201.
Phone: 1-800-356-4674, 1-800-35-NIOSH
www.niosh.gov

3. **American Conference of Governmental Industrial Hygienists (ACGIH)**. 1330 Kemper Meadow Drive, Cincinnati, OH 45240-1634.
Phone: 1-513-742-2020, Fax: 1-513-742-3355
www.acgih.org

Appendix A.

Typical Minimal Lockout / Tagout System Program

General:

Lockout is the preferred method of isolating machines or equipment from energy sources. To assist employers in developing a procedure that meets the requirements of the standard, however, the following simple procedure is provided for use in both lockout or tagout programs. This procedure may be used when there are limited number of types of machines or equipment or there is a single power source. *For more complex systems, a more comprehensive procedure will need to be developed, documented, and utilized.*

Lockout (or Tagout) Procedure for (Name of Company)

Purpose:

This procedure establishes the minimum requirements for the lockout or tagout of energy isolating devices. It shall be used to ensure that the machine or equipment are isolated from all potentially hazardous energy, and locked out or tagged out before employees perform any servicing or maintenance activities where the unexpected energization, start-up or release of stored energy could cause injury (Type(s) and Magnitude(s) of Energy and Hazards).

Responsibility:

Appropriate employees shall be instructed in the safety significance of the lockout (or tagout) procedure (Name(s)/Job Title(s) of employees authorized to lockout or tagout). Each new or transferred affected employee and other employees whose work operations are or may be in the area shall be instructed in the purpose and use of the lockout or tagout procedure (Name(s)/Job Title(s) of affected employees and how to notify).

Preparation for Lockout or Tagout:

Make a survey to locate and identify all isolating devices to be certain which switch(s), valve(s) or other energy isolating devices apply to the equipment to be locked or tagged out. More than one energy source (electrical, mechanical, or others) may be involved. (Type(s) and Location(s) of energy isolating means).

Sequence of Lockout or Tagout System Procedure:

1. Notify all affected employees that a lockout or tagout system is going to be utilized and the reason therefor. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards thereof.

2. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.)

3. Operate the switch, valve, or other energy isolating device(s) so that the equipment is isolated from its energy source(s). Stored energy (such as that in springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as repositioning, blocking, bleeding down, etc. (Type(s) of Stored Energy-methods to dissipate or restrain).

4. Lockout and/or tagout the energy isolating devices with assigned individual lock(s) or tag(s) (Method(s) Selected; i.e., locks, tags, additional safety measures, etc.)

5. After ensuring that no personnel are exposed, and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate (Type(s) of Equipment checked to ensure disconnections),

CAUTION: Return operating control(s) to "neutral" or "off" position after the test.

6. The equipment is now locked out or tagged out.

Restoring Machines or Equipment to Normal Production Operations

1. Check the machine or equipment and the immediate area around the machine or equipment to ensure that non-essential items have been removed and the machine or equipment components are operationally intact.

2. Check the work area to ensure that all employees have been safely positioned or removed from the area.

3. Verify that the controls are in neutral.

4. Notify the affected employees that the servicing or maintenance is completed and the machine or equipment is ready to use.

5. Remove the lockout/tagout devices and energize the machine or equipment.

Lockout / Tagout Devices

Locks used for lockout and tags used for tagout will be (specify certain colors) **.** Tags will be of outdoor flexible material, with place for employee name and terms "THIS EQUIPMENT

TAGGED OUT". There will be a hole in one end for affixing a plastic tamper proof tie. The tag will warn against hazardous conditions, (Do Not Start, Do Not Open, etc.)

Training

Training on lockout/tagout procedures will be conducted by (safety officer, shop supervisor, etc.) to ensure that it is understood by all of the employees and that they have the knowledge and skills required for the safe application, use, and removal of energy controls. This training will be given to all new employees within 30 days after being hired.

Training will include:

1. Recognition of hazardous energy sources**.**

2. Purpose and use of energy control procedures.

3. How other employees are or may be affected.

4. The limitations of tags [1910.147 (c)(7)(a)].

5. Training and retraining shall be documented in the "Training Log". The employee name and date of training will be entered.

Periodic Inspections

It is the responsibility of (safety officer, supervisor) to verify through periodic inspections that the energy control procedures are being implemented properly and that the employees are familiar with their responsibilities under the procedures.

The inspections will be done every 12 months and so noted in a Lockout/Tagout inspection logbook.

Procedure Involving More Than One Person

In the preceding steps, if more than one individual is required to lockout or tagout equipment, **each shall place his/her own personal lockout device or tagout device on the energy isolating device(s).** When an energy-isolating device cannot accept multiple locks or tags, a multiple lockout or tagout device (hasp) may be used. If lockout is used, a single lock may be used to lockout the machine or equipment with the key being placed in a lockout box or cabinet which allows the use of multiple locks to secure it. Each employee will then use his/her own lock to secure the box or cabinet. As each person no longer needs to maintain his or her lockout protection, that person will remove his/her lock from the box or cabinet (Name(s)/Job Title(s) of employees authorized for group lockout or tagout).

Basic Rules for Using Lockout or Tagout System Procedure:

All equipment shall be locked out or tagged out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy-isolating device where it is locked or tagged out.

LOCKOUT (OR TAGOUT) PROCEDURE

Entry No. (Description)

1. **Name of Company**

2. **Type(s) and Magnitude(s)** of energy and hazards

3. **Name(s)/Job Title(s)** of employees authorized OT lockout or tagout

4. **Name(s)/Job Title(s)** of affected employees and how to notify

5. **Type(s) and Location** of energy isolated means

6. **Type(s) of Stored Energy** methods to dissipate or restrain

7. **Method(s) Selected** i.e., locks, tags, additional safety measures, etc.

8. **Type(s) of Equipment** checked to insure disconnections

9. **Name(s)/Job Title(s)** of employees authorized to group lockout or tagout